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EXHIBIT A

ORIGINAL CLAIMS IN THE PARENT PATENT APPLICATION

Serial No. 08/844,383

Filed April 18, 1997

What is claimed is:

1. A method for transmitting data elements (DATA) from a transmitter (TX) to a receiver (RX), wherein:

- a. said data elements (DATA) are modulated on at least one carrier;
- 5 b. a pilot carrier used for synchronisation between said transmitter (TX) and said receiver (RX) is multiplexed with said at least one carrier;
- c. said at least one carrier and said pilot carrier are transmitted over a transmission medium (TM) interconnecting said transmitter (TX) and said receiver (RX),

10 characterized in that

- d. said pilot carrier is modulated with a non-constant signal before it is transmitted.

2. A method according to claim 1, characterised in that said non-constant signal is a random or pseudo-random signal.

15 3. A method according to claim 1, characterised in that said non-constant signal is an alternating signal, subsequently alternating between different states of the modulation constellation.

4. A method according to claim 1, characterised in that said non-constant signal consists of part of said data elements (DATA) to be transmitted.

20 5. A method according to claim 1, characterised in that said transmitter (TX) and said receiver (RX) constitute a discrete multitone (DMT) transceiver according to the Asymmetric Digital Subscriber Line standard T1E1.413.

25 6. A method according to claim 5, characterised in that said data elements (DATA) modulated on said pilot carrier are operation channel data elements or overhead control channel data elements such as data elements used for maintenance or indicating a modification of the number of bits modulated on a carrier of said at least one carrier.

7. A transmitter (TX), adapted to transmit data elements (DATA) to a receiver (RX) via a transmission medium (TM), said transmitter (TX) comprising:

- a. modulation means (MOD) to a first input of which said data elements (DATA) are applied, said modulation means (MOD) being adapted to modulate said data elements (DATA) on at least one carrier, and to multiplex said at least one carrier with a pilot carrier used for synchronisation between said transmitter (TX) and said receiver (RX);
- b. pilot information means (TPT), adapted to generate information to identify said pilot carrier, and to apply said information to a second input of said modulation means (MOD); and
- c. line interface means (TI), coupled between an output of said modulation means (MOD) and an input of said transmission medium (TM), and adapted to condition said at least one carrier and said pilot carrier to be transmitted over said transmission medium (TM),

characterised in that

- d. said modulation means (MOD) is further adapted to modulate said pilot carrier with a non-constant signal.

8. A receiver (RX), adapted to receive a signal (S') transmitted thereto by a transmitter (TX) via a transmission medium (TM), said receiver (RX) comprising:

- a. line interface means (RI), coupled to an output of said transmission medium (TM) and adapted to condition said signal (S') to be applied to components of said receiver (RX);
- b. demodulating means (DMOD), an input of which is coupled to an output of said line interface means (RI), said demodulating means (DMOD) being adapted to demultiplex in said signal (S') a pilot carrier from at least one carrier whereon data elements (DATA') are modulated, and to demodulate said data elements (DATA') from said at least one carrier; and
- c. pilot information means (RPT), adapted to generate information to identify said pilot carrier, and to apply said information to a second input of said demodulation means (DMOD),

characterised in that

- d. said demodulating means (DMOD) further is adapted to demodulate a non-constant signal from said pilot carrier and to use the demodulated pilot carrier for synchronisation.

9. A transmission system comprising a transmitter (TX), a receiver (RX) and a transmission medium (TM), coupled between an output of said transmitter (TX) and an input of said receiver (RX), said transmitter (TX) comprising:

- a. modulation means (MOD) to a first input of which data elements (DATA) are applied, said modulation means (MOD) being adapted to modulate said data elements (DATA) on at least one carrier, and to multiplex said at least one carrier with a pilot carrier used for synchronisation between said transmitter (TX) and said receiver (RX);
- b. pilot information means (TPT), adapted to generate information to identify said pilot carrier, and to apply said information to a second input of said modulation means (MOD); and
- c. line interface means (TI), coupled between an output of said modulation means (MOD) and an input of said transmission medium (TM), and adapted to condition said at least one carrier and said pilot carrier to be transmitted over said transmission medium (TM), and said receiver (RX) comprising:
  - d. line interface means (RI), coupled to an output of said transmission medium (TM) and adapted to condition a signal (S') received therefrom to be applied to components of said receiver (RX);
  - e. demodulating means (DMOD), an input of which is coupled to an output of said line interface means (RI), said demodulating means (DMOD) being adapted to demultiplex in said signal (S') said pilot carrier from said at least one carrier, and to demodulate data elements (DATA') from said at least one carrier; and
  - f. pilot information means (RPT), adapted to generate information to identify said pilot carrier, and to apply said information to a second input of said demodulation means (DMOD),

characterised in that

- g. said modulation means (MOD) is further adapted to modulate said pilot carrier with a non-constant signal; and
- h. said demodulating means (DMOD) is adapted to demodulate said non-constant signal from said pilot carrier and to use the demodulated pilot carrier for synchronisation.